

PATENT COOPERATION TREATY

TRANSLATION

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

Date of mailing (day/month/year) **14.02.2006**

Applicant's or agent's file reference

10820-GE-PCT

FOR FURTHER ACTION

See paragraph 2 below

International application No.

PCT/JP2005/020063

International filing date (day/month/year)

01.11.2005

Priority date (day/month/year)

01.11.2004

International Patent Classification (IPC) or both national classification and IPC

G11C16/04, H01L21/8247, H01L27/115, H01L29/788, H01L29/792

Applicant

GENUSION Inc.

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/JP

Date of completion of this opinion

Authorized officer

Facsimile No.

Telephone No.

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/JP2005/020063

Box No. I

Basis of this opinion

1. With regard to the language, this opinion has been established on the basis of:
 - ☒ the international application in the language in which it was filed
 - ☐ the translation of the international application into _____, which is the language of a translation furnished for the purposes of international search (Rule 12.3(a) and 23.1(b)).
2. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material
 - ☐ on paper
 - ☐ in electronic form
 - c. time of filing/furnishing
 - ☐ contained in the international application as filed
 - ☐ filed together with the international application in electronic form
 - ☐ furnished subsequently to this Authority for the purposes of search
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table(s) relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/JP2005/020063

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	2-6	YES
	Claims	1, 7	NO
Inventive step (IS)	Claims		YES
	Claims	1-7	NO
Industrial applicability (IA)	Claims	1-7	YES
	Claims		NO

2. Citations and explanations:

Document 1: JP 09-246404 A (Mitsubishi Electric Corp.),
19 September 1997, paragraphs [0030]-[0052],
fig. 1-6 (Family: none)

Document 2: JP 09-008153 A (Mitsubishi Electric Corp.),
10 January 1997, paragraphs [0008]-[0014],
fig. 34-38, & US 5877524 A1

Claims 1 and 7

The inventions set forth in claims 1 and 7 lack novelty and do not involve an inventive step in the light of document 1 cited in the international search report.

Document 1 (fig. 6) discloses a feature of a p-type nonvolatile memory cell formed in an n-type well, wherein a relationship of " $V_g(=+8V) > V_{sub}(=0V) > V_s(=-1.5V) > V_d(=-6V)$ " is satisfied during a write operation, a hot electron is generated close to a drain using band-to-band tunneling, and data is written by injecting the hot electron into a charge accumulation layer. Further, document 1 also discloses the configuration of a DINOR-type memory array. Accordingly, the inventions set forth in claims 1 and 7 are disclosed in document 1.

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/JP2005/020063

Box No. V

Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement

Claims 3 to 6

The invention set forth in claims 3 to 6 does not involve an inventive step in the light of document 1 cited in the international search report.

Claims 3 to 6 specifically define the following features of the invention set forth therein. Two voltages from among V_g , V_{sub} , V_s , and V_d are supplied from an external power supply, or V_d and V_s are supplied from an external power supply, and V_s is the power supply potential, whereas V_d is the ground potential. However, supplying voltages required for a write operation from an external power supply is a known technique, and thus, no particular difficulty is recognized in the supply from an appropriate power supply of a voltage for V_g , V_{sub} , V_s , or V_d during a write operation in the invention disclosed in document 1. Further, in order to carry out a write operation by generating a hot electron close to a drain using band-to-band tunneling, appropriately selecting a voltage other than the voltages disclosed in document 1 and supplying said selected voltage is merely a feature fittingly determined by a person skilled in the art. Accordingly, a person skilled in the art could easily conceive of the invention set forth in claims 3 to 6.

Claim 2

The invention set forth in claim 2 does not involve an inventive step in the light of document 1 and document 2 cited in the international search report.

The invention set forth in claim 2 is an n-type nonvolatile memory cell formed inside a p-type well, and claim 2 stipulates a relationship between voltages during a write operation carried out by generating a hot

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/JP2005/020063

Box No. V

Reasoned statement under Rule 43bis1(a)(i) with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement

electron close to a drain using band-to-band tunneling, but carrying out a write operation by using the phenomenon of band-to-band tunneling close to a drain is known in the art, as disclosed in document 2. Thus, no particular difficulty is recognized in the applying of the technical feature disclosed in document 1 to an n-type nonvolatile memory cell, nor when doing so, would the inverting of the respective magnitude correlations among V_g , V_{sub} , V_s , and V_d of the p-type nonvolatile memory element disclosed in document 1 constitute an exceptional feature. Accordingly, a person skilled in the art could easily conceive of the invention set forth in claim 2.

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/JP2005/020063

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

Claim 6 is a dependent claim of claim 5, and as such, a dependent claim of claim 2. However, the description does not sufficiently support an instance wherein V_s is designated as the power supply potential and V_d is designated as the ground potential when the memory cell used is an n-type memory cell.

Williams, Deborah

JULY 24, 2008

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7/24/2008

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7/24/2008

DO/EO WORKSHEET

U.S. Appl. No. 10-548853

Patent Application Specialist/ National Stage Division

International Appl. No. PCT/JP 2005/020063

Application filed by : ☐ 20 months ☒ 30 months

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INTERNATIONAL APPLICATION PAPERS IN THE APPLICATION FILE :

☒ International Application (RECORD COPY)

☐ PCT/IB/306

☐ Article 19 Amendments

☐ Request form PCT/RO/101

☒ PCT/IPEA/409 IPER : ☒ EP ☐ JP ☐ SE ☐ AU
☐ US ☐ FR ☐ CN ☐ ES ☐ RU ☐ AT ☐ KR ☐ _____

☒ PCT/ISA/210 - Search Report : ☒ EP ☐ JP ☐ SE ☐ AU
☐ US ☐ FR ☐ CN ☐ ES ☐ RU ☐ AT ☐ KR ☐ _____ ☐ NONE

☐ Annexes to 409

☒ Search Report References

☒ PCT/ISA/237 : ☐ EP ☐ JP ☐ SE ☐ AU
☐ US ☐ FR ☐ CN ☐ ES ☐ RU ☐ AT ☐ KR ☐ _____
☐ PCT/IPEA/409 or PCT/ISA/237 was NOT AVAILABLE at the time of paralegal review

☒ Priority Document (s) No. 4

☐ N/A

☐ Priority Document was NOT AVAILABLE at the time of paralegal review

☐ Other : _____

RECEIPTS FROM THE APPLICANT (other than checked above) :

☒ Basic National Fee (or authorization to charge)

☒ Preliminary Amendment(s) Filed on :

1. ☐ same as 371 request date 2. 1-09-07 3. _____

☒ Description ☒ Claims ☒ Abstract

☒ Information Disclosure Statement(s) Filed on :

1. ☐ same as 371 request date 2. 9-25-06 3. _____

☒ Drawing Figure(s) - (# of dwgs. 1)

☐ Assignment Document (forwarded to Assignment Branch)

☐ Translation of Article 19 Amendments

☐ Assignee Statement Under 37 CFR 3.73(b)

☐ entered ☐ not entered :

☐ Assignee PG Publication Notice

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☐ replaced by Article 14 Amendment

☐ Substitute Specification Filed on :

1. ☐ same as 371 request date 2. _____ 3. _____

☐ Annexes to 409

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☐ Verified Small Status Statement

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☒ Oath/ Declaration (executed) 10-12-06

☒ Application Data Sheet

☐ Oath/ Declaration ☐ unsigned ☐ no citizenship ☐ other

☒ Power of Attorney

☐ DNA Diskette ☐ Sequence Listing

☐ Change of Address

☐ Other : _____

NOTES : ☐ I.A. used as Specification ☐ Other : _____

35 U.S.C. 371 - Receipt of Request (PTO-1390)

mo. 09 / day 13 / yr. 2006

Date Acceptable Oath/ Declaration Received

☐ Same as 371 Req. Date; ☐ mo. 10 / day 12 / yr. 2006

Date of Completion of requirements under 35 U.S.C. 371

☐ Same as 371 Req. Date; ☐ Same as OATH Date; ☐ mo. 10 / day 12 / yr. 2006

Date of Completion of DO/EO 903 - Notification of Acceptance

Date of Completion of DO/EO 905 - Notification of Missing Requirements

Date of Completion of DO/EO 909 - Notification of Abandonment

Date of Completion of DO/EO 916 - Notification of Defective Response

Date of Completion of DO/EO 922 - Notification to Comply w/ Requirements for Patent Applications

Containing Nucleotide and/or Amino Acid Sequence Disclosures

Date of Completion of DO/EO 923